No. 4586

PROVINCE OF ALBERTA

HIGH SCHOOL AND UNIVERSITY
MATRICULATION EXAMINATIONS BOARD

DEPARTMENTAL EXAMINATIONS, 1937

ALGEBRA 2.

Time—2½ hours.

Note—Sufficient work must be shown to indicate method of solution.

Graph paper will be supplied by the presiding examiner.

Values

2 **1.** What *factor* or *factors* are common to $xyz - y^2z$ and $x^2z - xyz$?

1 **2.** What *term* or *terms* are common to $x^2 - y^2$ and $xy - y^2$?

5 **3.** Change to a single fraction:

$$\frac{2x-1}{3x} - 5 - \frac{x-2}{6}$$

5 **4.** Reduce to lowest terms: $\dfrac{2x^2 + x - 3}{6x^2 + 5x - 6}$

10 **5.** Solve including verification: $\begin{cases} \dfrac{1}{x} + \dfrac{2}{y} = 1 \\ \dfrac{4}{x} + \dfrac{1}{y} = 2\frac{1}{4} \end{cases}$

6 **6.** Rationalize the denominator of the fraction

$$\frac{\sqrt{5} + 2\sqrt{3}}{2\sqrt{5} - \sqrt{3}}$$

7 **7.** Given that $\sqrt{7} = 2.646$, find to the nearest hundredth the value of x which makes $18x^2 + 9$ equal in value to $30x$.

Values

12 **8.** I want to make a right-angled triangle using a stick 17 inches long for hypotenuse and a piece of string 25 inches long for the two sides. If I require two inches of the string for fastenings, what will be the lengths of the sides of the triangle?

1 **9.** Into how many segments, each $\frac{5}{6}$ inch in length, can a line k inches long be divided?

1 **10.** State in words the equation $6n^2 - 5n = 28$.

2 **11.** Express $\dfrac{x}{x+y}$, as (a) a percentage, (b) a fraction having denominator x.

2 **12.** Two trains leave a town at the same time and travel in the same direction. The faster one goes F miles per hour and the slower goes S miles per hour. In how many hours will they be $K - 5$ miles apart?

10 **13.** Solve including verification: $\begin{cases} x^3 - y^3 = 19 \\ x - y = 1 \end{cases}$

2 **14.** Simplify: $2ab^2(a^2b^6)^{-\frac{1}{2}}$

5 **15.** *Either* $\left\{\begin{array}{l}\text{Simplify: } (y^{\frac{1}{2}} + 3y^{\frac{1}{4}} + 1)(y^{-\frac{1}{4}} + 2y^{-\frac{1}{2}}) \\ \quad\text{Check your result, using } y = 16.\end{array}\right.$

Or

State whether each of the following equations has three roots only, two roots only, one root only, or no root.

(1) $x + \sqrt{2x - 1} = 0$

(2) $4x(x^2 - 3x + 2) = 0$

(3) $\dfrac{x+1}{x^2+1} = 0$

(4) $a^x = \dfrac{1}{a}$

(5) $10^x = 1$

Values

8 **16.** What characteristic of each of the following systems of equations is shown by their graphical representation?

(*a*) $\begin{cases} 3x - 2y = 5 \\ 3x - 2y = 10 \end{cases}$ (*b*) $\begin{cases} x + 2y = 7 \\ 2x + 4y = 14 \end{cases}$

(*c*) $\begin{cases} 3x - y = 5 \\ 3x + y = -5 \end{cases}$ (*d*) $\begin{cases} 2x + 3y = 0 \\ 3x - 4y = 0 \end{cases}$

9 **17.** Solve including verification:

$$\sqrt{2x - 4} - \sqrt{x + 5} = 1$$

12 **18.** *Either*

A hoop of radius *b* feet is being rolled along with a velocity *V* feet per sec. and comes to a step *h* feet high. The hoop will climb the step if the velocity is not less than that expressed by the equation

$$\frac{V^2}{64} = \frac{2bh}{(2b - h)^2}$$

If the radius of the hoop is 1 ft. 6 in. and the height of the step is 9 in., what is the velocity which will just enable the hoop to climb the step?

Or

An automobile goes to a place 72 miles distant and then returns, the round trip occupying 9 hours. The speed in returning is 12 miles per hour greater than the speed in going. Find the speed each way.

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